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ABSTRACT

This paper is based upon the findings of four major research projects. The first project (1986-88) explored issues of good practice, accreditation, and progression in information technology (IT) education and training for teenagers between the ages of 12 and 20. The second project produced the National Curriculum documents. A consensus resulted about principles and policies for IT in the National Curriculum, recently implemented in England and Wales. This document briefly examines the history involved in the implementation of IT in the National Curriculum within the following five contextual stages: (1) the initial absence of an educational policy toward IT in education; (2) the development and lead of classroom practice; (3) the philosophical differences among those educators who are partial to either the narrow or broad conceptions of the role of IT in education; (4) the search for key IT skills; and (5) the agreement upon the need to promote broad IT capability. The conclusion focuses on the purpose of IT--to support the development of active independent critical learning by effectively using IT across the curriculum and to develop and implement whole-school IT policies and coherent patterns of local support. (Eight references) (JAM)

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THE CASE FOR BREADTH IN COMPUTING AND INFORMATION TECHNOLOGY EDUCATION AND TRAINING FOR 13-19 YEAR OLDS.

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The case for breadth in computing and information technology education and training for 13 - 19 year olds.

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Summary

This paper is based upon the findings of two major research projects. The first project (1986-88) explored issues of good practice, accreditation and progression in IT education and training for 13 - 19 year olds. The research highlighted the need to develop general transferable skills in IT related contexts and to help all youngsters develop a broad IT capability. The new National Curriculum documents offer support for such views and there is now a large measure of curricular agreement about principles and policy.

However, formidable barriers remain against practical implementation and emphasis may be given to the development of pupils IT capability, perhaps narrowly defined, at the expense of enriching the curriuclum. This foreshadows the importance of a programme to improve the support available to make more effective use of IT across the curriculum. This is the substance of the second project (1989-1992).

Introduction

If one wishes to consider how the proposals for IT in the National Curriculum, recently implemented in England and Wales, are likely to operate in practice it is perhaps instructive first to look at the development of policy and the interplay of policy and practice over the last decade. Five stages can be divined: an initial absence of an educational policy; the development and lead of classroom practice; the debate between narrow and broad conceptions of the role of IT in education; the search for key IT skills; agreement upon the need to promote a broad IT capability. A relevant question at this time could be why should we first focus upon the past? However, we arrived here, have we not now a sensible policy and should not all efforts be concerned with implementing it? I will argue that teachers in England and Wales are faced with formidable barriers to implementation and some of these are legacies of previous working out of policies in practice. In particular, past practice should alert us to the dangers that the `policy in action' might be much narrower and more limiting than the current lofty goals for IT in the national curriculum. Each stage will, therefore, be briefly examined and a consideration given to what are legacies and implications for current attempts to implement the latest IT policy.

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Initial absence of an educational policy towards IT in education

Early in the 1980s there was little educational debate in England and Wales about the role or value of computers in education. Hardware was rushed into schools with the evocation of rapid social and technical change acting as a substitute for educational debate (Linn 1985). National policies were almost totally lacking any educational underpinning. Indeed the commercial urgency to use IT in international trade was uncritically translated into the need for young people to use computers in schools. There was a plethora of initiatives and schemes to promote the use of IT in education and training (Beynon and Mackay 1989). Working with IT would be required by large numbers of people in future, hence it was considered self-evident that young people needed to develop requisite IT skills now. There was, however, no agreement on what those skills should be.

Development and lead of classroom practice

Some innovative work including the Schools' Council Computers in the Curriculum project had taken place prior to the 1980s, but this was limited to a small number of schools. Such work was important, however, in that it set a model of close collaboration with teachers, whereby what actually happened in the classroom was a key consideration. Subsequent initiatives over the next 5 years or so, excluding those which were solely for the purchase of hardware, similarly sought to give consideration of and support for teachers in developing `good' classroom practice. While most of these could point to particular successes, they suffered one major problem. The problem was that successful use of IT in classrooms seemed to depend largely upon a few `keen' individuals and groups (whether classroom teachers or heads, possibly with support of advisers, researchers and developers), and usage often decayed if key individuals moved on, either physically or in terms of professional interest. The result was that developments in England and Wales were well-represented at conferences like this, but this image belied the reality. The overall policy lacked coherence, and support for teachers, even when not fragmented and under-resourced, was still often drive by hardware and/or software rather than educational considerations.

One effect of allowing classroom teachers to develop practice, without consideration of the wider implications, was that schools were acquiring IT policies by default. If scarce resources were being used by particular teachers for specific puposes, then they could not be used by others. Almost everywhere, schools IT resources (both staff and equipment) were being primarily used by small groups of pupils (mainly on computer studies courses).

The debate: narrow v. broad conceptions of role of IT in education

The situation started to change around 1986-87. There was an increasing realisation that effective use of IT was greatly enhanced when it was used across the curriculum. Significantly arguments for this change were based on educational grounds. Indeed IT was seen as a useful tool to accomplish other educational goals, not uncritically accepted as automatically valuable in its own right. There was also increasing recognition that resources should not be more or less exclusively `locked up' in computer studies provision, if greater use was to be made by all pupils of IT across the curriculum. The case for breadth of conception in IT in education was clearly winning the argument: educational issues were re-emerging. However, a feeling remained that might not there still be some `special' or `new' IT skills, which all young people would need if they were to participate in the IT-rich future. Two projects were commissioned in a last attempt to search for this particular `holy grail'.

The search for key IT skills

As a result, two of the major initiatives (the Technical and Vocational Education Initiative TVEI and the Youth Training Scheme YTS) commissioned work to look at what were the key IT skills which should be developed in their programmes. At the time (1986) TVEI was still a pilot programme and although designed as a programme for 14 - 18s, the development work was mostly school-based for 14 -16s. The YTS was primarily work-based, and was being extended from a one year to a two year scheme, largely for 16 - 18s. However, both research teams came back, not only without the grail but also arguing that the quest itself was ill-conceived.

The TVEI-sponsored "Skills for the Future" project team, based at the University of Sheffield and led by Wellington, had set out to investigate the links between education and employment in the field of IT. They concluded: "the search for an indication of "skills for the future" is a fruitless and mistaken one. In a period of continuing technological change the emphasis is increasigly likely to be on general abilities rather than specific skills" (Wellington 1987). The YTS-sponsored project, based at the University of Surrey and led by the author focused upon issues of good practice, accreditation and progression in computing and information technology within YTS. These are fully reported elsewhere (Brown & Mills 1988). However, the project also sought to place these developments within the context of related developments elsewhere. In particular, there was a need to consider IT education and training for 13 - 19 year olds as a whole in order to facilitate individual progresssion and development. Brown and Mills were, like Wellington, highly sceptical about the value of trying to promote particular IT skills, which could be universally prescribed as likely to be of value to all young people in the future. Rather they argued that the overall purpose should be to develop an IT capability.

Promotion of a broad `IT' capability

Brown & Mills argued that essential elements of an IT capability should include the development of an `openness' towards the use of IT, the ability to work as a member of a team, flexibility in response and a willingness to learn and undertake further training (Brown & Mills 1987). If this appears rather general, it should be remembered that Fitzgerald drew attention to how specific IT-related skills could be acquired fairly readily by employees in a context (at work) which had meaning for them (Fitzgerald 1985). Employers were virtually unanimous in not wanting a narrow skills based approach (Wellington 1987). Research from Europe also substantiated this view (it is inappropriate to give full references here, see Brown & Mills 1987). The rejection of the view that it is possible to promote particular IT skills, which could be universally prescribed as likely to be of value to all young people in the future was virtually complete. Policy was also moving strongly in this direction, and support was given to try and effect practice in the classroom. The Department of Education and Science instigated a major programme of educational support such that each local education authority could employ teams of IT advisory teachers to promote IT across the curriculum in schools. The tide of advice from national, regional and local organisations on this became a flood.

The role for IT in the national curriculum

It is unnecessary to try and detail the proposals for IT in the new national curriculum. There has been extensive commentary and debate about them. Suffice it to say that from the very first associated documentation a broad view of the role of IT in schools has been promoted: it is primarily to be seen as a cross-curricular tool to facilitate learning and assessment in many subjects. (IT is also one of the components of the technology curriculum, but at the level of policy this is not as important. I shall return to the implications of this in practice later.)

Implementation of IT in the national curriculum: Lessons from previous stages

Educational considerations need to be kept on the agenda.

The debate between the broad and narrow conceptions of the role of IT in education was so one-sided, that it seems inaccurate to characterise it as a debate. This was surely inevitable once educational considerations became paramount. However, that is the key point educational considerations do have to struggle with other sets of ideas and practical considerations. They were almost completely absent from educational policy towards IT in the early 1980s. They predominated in policy debates about the role of IT in education in the period 1986-89 and they were also starting increasingly to influence practice. It is not certain that this will be the case for the next few years. There are dangers that pragmatic considerations associated with the implementation of the national curriculum may mean that the role

for IT in schools in practice is far removed from the lofty goals laid down in either advice or statute. The organisational issues associated with staffing, resources and assessment in relation to IT are huge (Brown 1990) and these alone may mean that there is a risk that broader educational issues concerning the quality of learning using IT do not even surface in some schools, let alone be successfully tackled. The case for breadth in IT education and training has to be continually restated: concern with implementation should not obscure purpose.

Need for whole school co-ordination of IT

During the period when pursuit of good classroom practice took place without consideration for developments elsewhere in the school there was little evidence of widespread (or even continuing) institutionalisation of `good practice' in IT in education. Now IT in schools will require explicit management if the key issues of assessment, progression, resources and staff development are to be tackled at level of the school as a whole (Brown 1990). In order to do this, other legacies such as current practices on siting computers, pupil access, which subjects and curricular applications to support will need to be re-examined. This would be almost impossible to do without a coherent whole school policy towards IT.

Quality of learning using IT

Both the above lessons come together in the need to consider the quality of learning using IT. At previous times there has sometimes been a feeling that promoting the use of IT in education is itself a `good thing'. It should be remembered that broader educational issues concerning the quality of learning using IT need to be paramount. The case for the development of a critical approach and the need to ensure the overall primacy of purpose is to support learning has been persuasively argued by Boomer among others: "computers, like writing, should not be considered separately from the purposes and values being served.....the least we can do is to make sure that learning with the assistance of computers is carried out by learners who are active, critical and in control" (Boomer 1983).

The dangers that the value of using IT to enrich the curriculum may be squeezed out in the implementation of IT in the national curriculum come from a number of sources. For example, the high degree of specificity in the form of attainment targets may lead to some `narrowing' in that there is teaching down to the attainment targets (that is, little attempt to go outside or beyond them), and the IT components of particular subjects may be taught as an addition to rather than integral to the rest of the curriculum. Although official policy is that the national curriculum is not a whole curriculum, it could squeeze time available to reflect upon processes. For IT this could end in a mechanistic use of IT tools, rather than allowing pupils time to reflect upon, for example, their approaches to and uses of modelling, problem-solving strategies and the like.

Conclusion

IT education and training for young people over the last decade can be portrayed as a struggle between breadth and narrowness of conception and implementation. In the narrower view the focus is predominantly upon the IT, whereas the prime emphasis in the broader view is educational. At the level of policy, the battle appears to have been won by the broader view. However, the sheer scale of implementation issues associated with IT in the national curriculum may mean that a far narrower `policy in action' occurs in the classroom. The case for breadth in IT education and training then still needs to be put. The central purpose of IT in education should be to support the development of active, critical learning. It should not be seen as a goal in itself. Until this is reflected in implementation as well as policy, the struggle continues.

Postscript

A final optimistic note can come from a national development programme to improve teacher support to facilitate effective use of IT across the curriculum, including the promotion of independent learning. It seeks both to support classroom practice directly and to help in the development and implementation of whole-school IT policies and coherent patterns of local support.

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